1524 Springvale Avenue
McLean, Virginia 22101
April 30, 1982

Hank S. Magnuski, KA6M
311 Stanford Avenue
Menlo Park, CA 94025

Dear Hank,

Confirming our telephone converstation, please send me a brief letter stating your willingness to serve on the ARRL digital communications ad hoc committee. It should include a "statement of background and qualificiations" per the original call in the September 1981 QST.

73,

Paul L. Rinaldo, W4RI

THE AMERICAN RADIO RELAY LEAGUE, INC.
HEADQUARTERS SOCIETY OF THE INTERNATIONAL AMATEUR RADIO UNION
ADMINISTRATIVE HEADQUARTERS NEWINGTON, CONNECTICUT, U. S. A. 06111

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CLIFTON, VA 22024

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June 8, 1982

Dr. Henry S. Magnuski, KA6M
311 Stanford Avenue
Menlo Park, CA 94025

Subject: Advisory Committee on Amateur Radio Digital Communications

Dear Henry:

One of the matters inherited from the League's earlier administration is that of forming an advisory committee for the purpose of providing the ARRL Board of Directors with a source of expertise on digital communications. The transition involved some delay in forming the group, for which I apologize.

I am pleased to accept your offer to serve in this advisory capacity; the Committee will have a membership of 10, and you will be interested to know that the other members include the following:

Doug Lockhart, VE7APU
Wally Linstruth, WA6JPR
Eric L. Scace, K3NA
Joe Fisher, K5EJL
Dennis Connors, KD2S/7
Paul Newland, AD7I/2

Paul Rinaldo, W4RI, has agreed to serve as Chairman. Board of Directors Liaison member will be Pete Matthews, WB6UIA, Vice Director of the ARRL Southwestern Division, and the Headquarters Staff Liaison member will be Ed Kalin, K1RT.

The basic purpose of this Ad Hoc Committee will be to provide technical advice and guidance in establishing standards for Amateur Digital communications that are commensurate with the state of the art, available equipment and techniques, and are compatible with available amateur frequencies and practices. Questions in these areas will be referred to the committee via the chairman by both the ARRL Board and Staff, and your collective attention in developing appropriate responses

will have great potential value for the future of digital communications in the amateur radio service.

Thank you for your willingness to assist in this undertaking.

73,

Sincerely,

Victor C. Clark, W4KFC
President

VCC:dlf
cc: Paul Rinaldo
Vice Director Matthews
Ed Kalin
Director Stevens

Advisory Committee on Amateur Radio Digital Communications

Paul Rinaldo, W4RI — Chairman
1524 Springvale Avenue
McLean, VA 22101
(H) 703-356-8918
(B) 703-734-0878

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(B) 213-432-6981

Ed Kalin, K1RT — Hq. Staff Liaison
83 Kenmore Road
Bloomfield, CT 06002
203-243-2186

Doug Lockhart, VE7APU
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(H) 602-744-9306
(B) 602-626-2239

Paul Newland, AD7I/2
Thirty Victoria Place
Red Bank, NJ 07701
201-741-1151

St. Louis Area Packet Radio Club
1309 Gloucester Drive
Edwardsville, IL 62025

Mr. Hank Magnuski, KA6M
311 Stanford ave.
Menlo Park, CA 94025

Dear Hank:

As a result of the fine presentations made by WB9FLW, Pete Eaton and WD0ETZ, Bill Reed, there has been a great deal of interest stirred up in the St. Louis area over packet radio. On the 30th of June a group of 34 amateurs determined to form the St. Louis Area Packet Radio Club for the purpose of continuing the research and development being carried on by the Tucson Amateur Packet Radio Corporation.

Because we know of your interest and participation in the area of packet radio, we want to share with you the fact that our group now exists. SLAPR has 25 Beta boards requested for as many Beta Test Participants. Pete Eaton, WB9FLW, is the Beta Site Coordinator. We have over 70 interested persons in Greater St. Louis.

As one of our purposes is to disseminate the information gained through participation in the Beta Test, we have set out to prepare a monthly newsletter. Your name has been added to our original list in the hopes that you will reciprocate and share with SLAPR any information that will benefit the "state of the art" in amateur radio and especially packet radio. If you are presently involved in preparing information for publication to the fraternity, we would be most pleased to exchange with you.

On June 30th we elected the following slate of officers:

President	Pete Eaton, WB9FLW
Vice-president	Bill Reed, WD0ETZ
Treasurer	Ed Dillon, KA0AYO
Secretary	Gus Kuether, W9OFZ

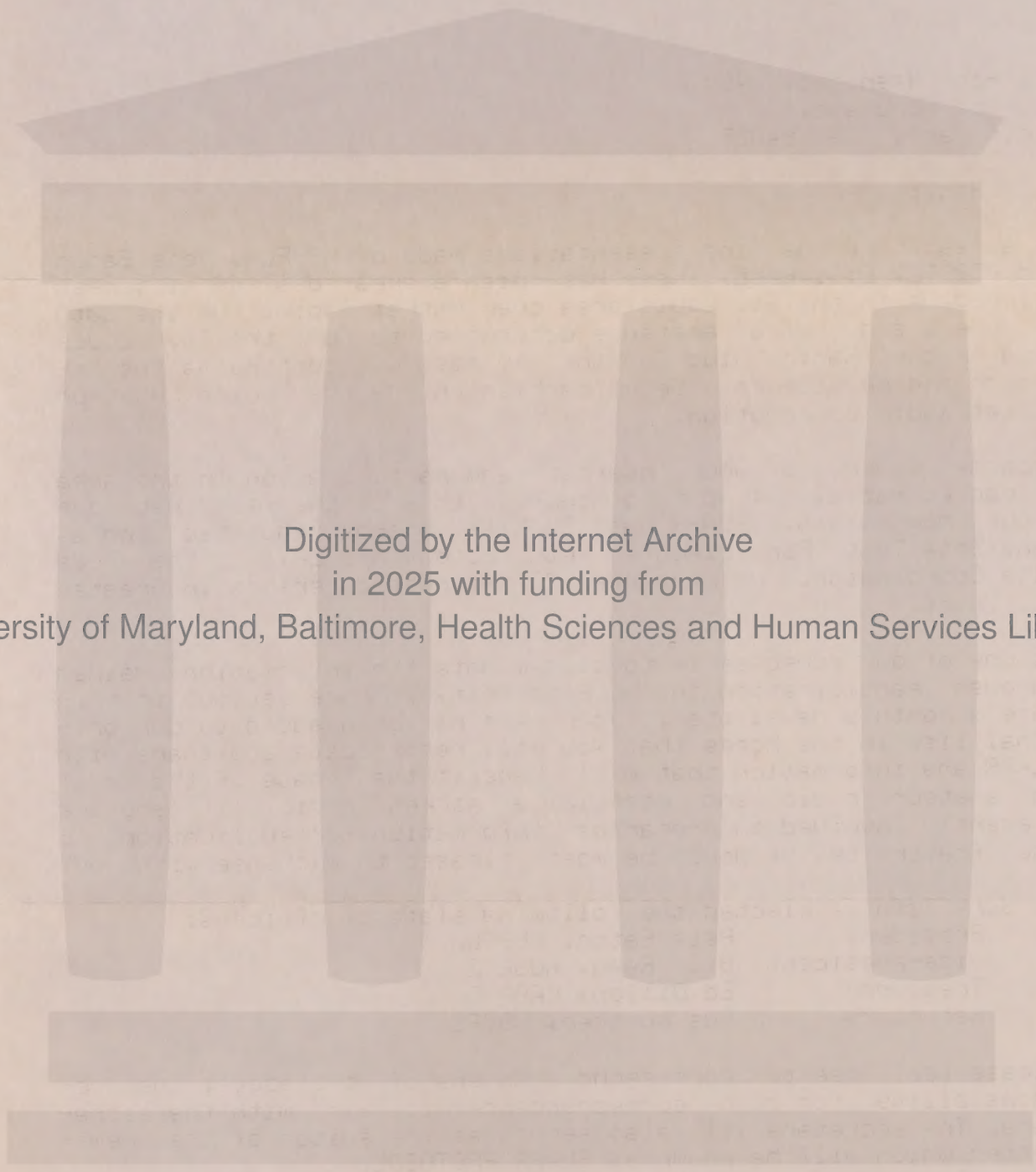
Please feel free to correspond with any of the above. The responsibility for club correspondence will lie with the secretary. The secretary will also serve as the editor of the newsletter which will be known as SLAPR PROTOCOL.

We look forward to hearing from you soon.

73,

Gus Kuether

Gus Kuether, W9OFZ, Secretary



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ARRL COMMITTEE ON AMATEUR RADIO DIGITAL COMMUNICATION

1524 Springvale Avenue
McLean, Virginia 22101
July 13, 1982

Dear Member:

Enclosed please find a copy of the initial committee report sent to Pete Matthews for presentation to the ARRL Board of Directors meeting at Cedar Rapids, IA next week. Because of the short time fuse, it was not possible to poll the committe members for inputs. It was Vic Clark's desire to get the Board's blessing on an ititial agenda for the committee.

The possibility remains that I overlooked the obvious and left out something that we should address. So, I suggest that you review the list starting on page 2 of the enclosure and let me know whether you agree with it or whether you feel that something should be added. Also, I would appreciate your ideas on what should be tackled first.

I expect to hear from Pete and/or Vic soon after the Board meeting and will let you know the outcome.

73,

Paul L. Rinaldo, W4RI
Chairman

THE AMERICAN RADIO RELAY LEAGUE, INC.
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ADMINISTRATIVE HEADQUARTERS NEWINGTON, CONNECTICUT, U. S. A. 06111

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ARRL COMMITTEE ON AMATEUR RADIO DIGITAL COMMUNICATION

July 13, 1982

The Board of Directors
American Radio Relay League

Ladies and Gentlemen:

On June 8, 1982, President Clark activated the ARRL Committee on Amateur Radio Digital Communication as authorized in Minute 85 of the 1981 Annual Meeting of the Board.

The basic purpose of this committee will be to provide technical advice and guidance in establishing standards for amateur digital communications that are commensurate with the state of the art, available equipment and techniques, and are compatible with available amateur frequencies and practices.

Serving on the committee are:

Paul L. Rinaldo, W4RI, Chairman	McLean, VA
Peter F. Matthews, WB6UIA, Board Liaison	San Pedro, CA
Edward B. Kalin, K1RT, Staff Liaison	Bloomfield, CT
Dennis T. Connors, KD2S	Tucson, AZ
Joe Fisher III, K5EJL	Austin, TX
Walter A. Linstruth, WA6JPR	Redondo Beach, CA
Douglas M. Lockhart, VE7APU	Don Mills, ON
Dr. Henry S. Magnuski, KA6M	Menlo Park, CA
Paul B. Newland, AD7I	Red Bank, NJ
Eric L. Scace, K3NA	Frederick, MD

Digital communication has been a part of Amateur Radio from the beginning, starting with Morse telegraphy. Although the first American teletypewriter was invented in 1906, amateur RTTY began in 1946. High-frequency RTTY was hampered because it was forced to use on-off keying until the FCC changed its rules in 1953 to permit frequency-shift keying (fsk). Since then there has been a steady growth of RTTY, due initially to the availability of Baudot machines at surplus prices. Beginning in 1975, RTTY amateurs began replacing their aging Baudot machines with personal computers. Many RTTY stations now on the air use personal computers programmed to convert from their native ASCII code to Baudot.

In September, 1978, the Canadian DOC authorized packet radio, spurring packet activity in Ottawa, Montreal, Vancouver and elsewhere. The FCC legalized ASCII (and by implication packet radio) in March of 1980. Straightforward serial ASCII transmission has been tried by a number of experimenters but has not sustained much interest. On the other hand, packet radio has attracted a group of several hundred amateurs in both the U.S. and Canada. It is now a subject of intense experimental interest and activity in both hardware and software development by a handful of amateur groups. There is rapid informal communication between these groups both electrically and through newsletters. Packet radio standards are being hammered out, and most committee members are deeply involved in this process. The general vision of those involved is the development of an amateur packet radio network spanning at least North American and including other countries wishing to join. Packet radio offers the possibility of error-free communication, automatic routing of traffic throughout the network, and a host of network (computer) services of value to all amateurs.

Since 1978, amateurs in the United Kingdom began experimenting with AMTOR, an amateur application of an error-reduction transmission technique used in the Maritime Mobile Service per CCIR Rec. 476-2. Several U.S. amateurs gained experience with AMTOR under a Special Temporary Authority from the FCC. On May 26, 1982, Counsel Imlay submitted to the FCC a petition on behalf of the League to ammend the Commission's rules to permit AMTOR in the Amateur Radio Service (designated RM-4122).

Lying ahead in amateur digital communications are developments in packet switching, error detection and correction, digital voice transmission as well voice input/output technology.

With the above background, Board approval is requested for the following committee tasks:

1. Monitor pending League petitions Docket 81-699 (to allow additional digital codes) and RM-4122 (AMTOR) and be prepared to provide technical assistance.

2. Review frequencies designated for RTTY in League band plans (vhf/uhf) and the "Considerate Operator's Guide" (which deals with hf). (The vhf/uhf band plans do not provide for RTTY, and the hf RTTY guidance does not agree with current usage.)

3. Work with packet radio and Baudot-RTTY groups to develop standards for amateur digital communications. (This should be done in such a way as to complement, not impede, the existing packet radio standards dialog.)

4. Develop an ARRL data communications directory. (The directory is to serve a function similar to the ARRL "Repeater Directory" and is to list frequencies, networks, digital repeaters, active groups and message systems.)

5. Review the "Specialized Communications Techniques for the Radio Amateur" Radioteletype Chapter, which is now seven years old and provide the staff with material for a new publication dealing with RTTY (including AMTOR and packet).

6. Review material in the 1983 edition of "The Radio Amateur's Handbook" which deals with RTTY (including AMTOR and packet).

7. After the FCC acts on Docket 81-699 (additional codes) and RM-4122 (AMTOR), study amended FCC rules and advise the Board whether the rules are adequate for digital communications experimentation and growth.

Respectfully submitted,

Paul L. Rinaldo, W4RI
Chairman

Ed Eklund, K6XI
14345 Brenan Way
Tustin, CA 92680

RECEIVED
A.R.R.L. #3
1982 AUG -2 AM 9:04

July 14, 1982

John F. Lindholm, W1XX
Communications Manager, ARRL
225 Main Street
Newington, CT 06111

Acked 7/29/82 WA1FCC

Re: NTS

Dear OM,

I once took the idea of amateur radio as a public service all too seriously and labored enthusiastically for the National Traffic System. That, of course, was bound to end up in disappointment. However, those years were happy and I think that others should be able to have the same experience but on a more solid basis than naivete. There are many out there on the big playground of amateur radio who are inclined to participate in public service and they deserve support.

One way to do this is to give NTS a chance to become what the public has a right to expect from the amateur service. I have several suggestions. The most important is about making the NTS operation more effective. That one is what this letter is about.

The main problem is the superstructure of NTS, which just happens to be the part of NTS for which the CM is directly responsibile. It is a system of excellence in inefficiency and an embarrassment to amateur radio. Maybe the low point was when a section net was harrassed because it generated too much traffic. Or was it the Alaskan earthquake? Or will it be the California earthquake?

The time has come to make NTS into what it should be. The means is now at hand and it is, as we all know, the microprocessor.

There is a catch though. The communications businesses have their special equipment, technically minded hams have all sorts of things going for their own amusement, and purveyors of ham equipment are coming out with goodies galore. However, there seems to be nothing available that is practical for amateur message handling.

As trafficers are mainly operators as distinguished from technical experts, and as they do not constitute a

sizeable market for the equipment manufacturers, it follows that they need assistance to make the equipment they need available to them.

In this case one would expect the leadership, after due consideration, not only to decide on a communications system but also specify the minimum requirements for the equipment. I'm sure some hams would then respond with solutions if the manufacturers don't consider the market profitable. It may be modifications to equipment made for more popular activites that CD promotes. For example, my "Terminal1" could probably be of some use if provided with new software.

There are several systems to consider. It would be very nice indeed to have a network of smart packet repeaters, but there we are talking about money that I suspect the members of ARRL would rather spend on other goodies. I think a gradual transition into the brave new world would be less traumatic.

The first step could be a modern version of the trunk lines. It could be called the new TCC to sweeten the concept. Let them terminate in something we could call the new regional nets. Of course, they won't be nets. Each one will be a trunk station in contact with suitably equipped liaisons from section nets, which nets may be on any mode. The scheme could be implemented in steps as could increased sophistication of the equipment.

I'm sure everyone will feel that he or she can come up with a better idea, that the wrath of vested interests will be intense, and that a committee could ponder these things well into the next century. But the time to act in the interest of "public convenience, interest, or necessity" is always right now. Or am I too naive again?

Best regards,

Ed, K6KI

CC: W6EJJ, W6INI, W4KFC, W6POU, W6WZO, N2YQ.

THE AMERICAN RADIO RELAY LEAGUE, INC.
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ADMINISTRATIVE HEADQUARTERS NEWINGTON, CONNECTICUT, U. S. A. 06111

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PETER F. MATTHEWS, WB6UIA
Vice-Director, Southwestern Div.
3403 S. Walker Avenue
San Pedro, CA 90731
(213) 547-5816

August 10, 1982

Mr. Paul Rinaldo, W4RI

1524 Springvale Ave.

McLean, VA 22101

Dear Paul;

Enclosed is a copy of Minute 53 and Minute 62 of the July 1982 ARRL Board of Directors meeting. I believe that these two items deserve consideration and action by the Committee on Digital Communications. Although Minute 53 is not directed to the Committee, we should be willing to provide input to the General Manager and perhaps to offer assistance. Minute 62 contains the actual charter for the Committee and I believe it covers all the points in your July 13, 1982 letter to the Board of Directors.

Our report to the Board of Directors will be due at their March 1983 meeting. Please keep me advised as to your progress and if any questions arise please feel free to contact me at any time.

Sincerely,

Pete

Peter F. Matthews,

WB6UIA

cc: Doug Lockhart, VE7APU

DR. Henry s. Magnuski, KA6M

Wally Linstruth, WA6JPR

Eric Scace, K3NA

Joe Fisher, K5EJL

Dennis Connors, KD2S/7

Paul Newland, AD7I/Z

Edward Kalin, K1RT

46) On motion of Mr. Nathanson, seconded by Mr. Dunn, it was unanimously VOTED that the Board stand in recess, at 5:00 P.M. for dinner. The Board reconvened at 8:21 P.M., with all persons hereinbefore mentioned present, and with President Clark in the Chair.

47) Mr. Wangler, as Chairman, presented the report of the Ad Hoc Committee on Biological Effects of RF Energy. On his motion, seconded by Mrs. Lewis, it was unanimously VOTED that the Counsel of the American Radio Relay League prepare a petition for presentation to the Federal Communications Commission requesting that the Commission retain control of power levels which may be generated by all forms of communication equipment when in the transmit mode, including amateur radio transmitters. It is further requested that they adopt the American National Standards Institute's 1982 allowable exposure levels for radio frequency energy, and retain this exclusive control under the Federal Communications Commission. Mr. Atkins abstained.

48) On motion of Mr. Wangler, seconded by Mr. Holladay, it was unanimously VOTED that the ARRL Committee on the Biological Effects of RF Energy proceed in responding to proposals made by federal, state and local government agencies seeking to regulate human exposure to radio frequency energy. The Committee is further directed to take advantage of every opportunity to urge federal preemption in this area and to discourage the establishment of arbitrary RF exposure standards by state and local governments.

49) Moving now to Agenda item 7, on motion of Mr. Sullivan, seconded by Mr. Butler, it was unanimously VOTED that the reports of the officers are accepted and placed on file.

50) As the first action on Agenda item 8, motions of directors, on motion of Mr. Atkins, seconded by Mr. Sullivan, it was unanimously VOTED that the President is instructed to appoint an Ad Hoc Committee to study possibilities for strengthening of the Canadian Radio Relay League and to examine and make recommendations as to such rearrangement of resource allocation and responsibility sharing between ARRL and CRRL as would result in optimum benefit to each corporation and its respective members.

51) On motion of Mr. Metzger, seconded by Mr. Grauer, after discussion it was unanimously VOTED that the Management and Finance Committee is instructed to work closely with the General Manager and Treasurer to explore operational cost reduction for strengthening the organizational cash flow.

52) On motion of Mr. Metzger, seconded by Mr. Grauer, it was unanimously VOTED that the Management and Finance Committee is instructed to review in detail the retirement plan for staff personnel and identify any changes considered desirable; further, that the results of these studies, together with appropriate recommendations, be reported to the Board of Directors no later than the Annual 1983 meeting.

53) On motion of Mr. Nathanson, seconded by Mr. Hurlbert, after discussion, unanimously VOTED that the General Manager investigate the possibility of a digital publication on the order of QEX to direct its

attention to digital applications to amateur radio including AMTOR, RTTY, Packet Radio and all allied areas of interest.

54) On motion of Mr. Nathanson, seconded by Mr. Stevens, it was unanimously VOTED that the General Manager be instructed to implement as soon as possible those new special interest publications that he has found feasible as a result of the prior investigation pursuant to the Board direction of March 1982.

55) On motion of Mr. Zak, seconded by Mr. Grauer, unanimously VOTED that the Membership Affairs Committee study the feasibility of providing to the membership, at a nominal charge, a loose leaf type of sectionalized operating manual and to standardize the size of the operating aids for incorporation into this manual.

56) It was moved by Mr. Grauer, seconded by Mr. Sullivan, that By-Law 6 be amended to strike the last sentence and to substitute therefor the following: "This special rate shall apply to Life Memberships only for members who have reached the age of sixty-five." A roll call vote being required, the question was decided in the affirmative; all of the directors voted aye, so the By-Law was AMENDED.

57) On motion of Mr. Sullivan, seconded by Mr. Holladay, it was unanimously VOTED that the President is instructed to appoint an Ad Hoc Committee to study and develop recommendations concerning steps that should be taken by ARRL to cope with the prospect of transfer of monitoring and licensing activities by the Federal Communications Commission to the Amateur Radio Service. This Committee shall report to the Board no later than 1 November 1982.

58) Moved by Mrs. Lewis, seconded by Mr. Stevens, that the following resolution be adopted by ARRL:

WHEREAS, the ARRL is promulgating a policy of openness with the membership, and

WHEREAS, the operation of the Board of Directors is not clearly understood by the members,

IT IS RESOLVED that the Board of Directors meetings be open for attendance for all members on a space available basis, reserving the right to close that portion of the meeting reserved for the Committee of the Whole or matters reserved for Board members only. After discussion, on motion of Mr. Price, seconded by Mr. Holladay, the matter was referred to the Membership Affairs Committee. Mrs. Lewis, Messrs Nathanson and Stevens asked to be recorded as voting against referral to the Committee; Mr. Hurlbert abstained.

59) On motion of Mr. Stevens, seconded by Mr. Sullivan, it was unanimously VOTED that, in view of recent FCC rulemaking which greatly expands the areas in which amateur power levels are restricted to 50 watts dc input in the band 420-450 MHz without special permission, the General Manager is directed to take steps to ensure that amateurs in the affected areas are able to obtain the required permission as easily and

quickly as possible.

60) It was moved by Mr. Milius, seconded by Mr. Butler, that the Board of Directors endorses in principle the changing of FCC rules to permit transmitter power in the Amateur Service to be regulated in terms of output rather than dc input, provided that amateurs operating transmitters incapable of exceeding the legal limit shall not be required to own instruments to measure output power. Moved, by Mr. Nathanson, seconded by Mrs. Lewis, that the matter be laid on the Table, but the motion to Table was LOST. Whereupon, the vote being on the original motion, the same was ADOPTED.

61) On motion of Mr. Butler, seconded by Mr. Carey, it was VOTED that the VRAC is directed to study the desirability of recommending to repeater owners the inclusion, in the repeater automatic on-the-air identification, of a geographical identifier which will assist transient stations in locating the repeater.

62) On motion of Mr. Holladay, seconded by Mr. Butler, it was unanimously VOTED that the Board of Directors requests the ARRL Committee on Amateur Radio Digital Communication to conduct the following activities as its initial task assignment:

A. Monitor pending League petitions in Docket 81-699 and RM 4122 and be prepared to provide technical assistance.

B. Review frequencies designated for RTTY in League band plans.

C. Work with packet radio and RTTY groups (Baudot, ASCII, etc.) to develop standards for amateur digital communications.

D. Develop an ARRL data communications directory.

E. Review existing ARRL publications dealing with RTTY and digital communications and make recommendations for updates.

F. With the impending release of FCC Docket 81-699 and RM 4122, the Committee shall study the amended FCC rules and advise the Board whether these rules are adequate for digital communications experimentation and growth.

The initial report of this Committee shall be made at the 1983 Annual Meeting.

63) On motion of Mr. Wangler, seconded by Mr. Zak, after discussion, it was unanimously VOTED that the six meter band plan proposed under Minute 82 of the March 1982 Board Meeting be reviewed by the current VHF/UHF Advisory Committee in consultation with the VHF Repeater Advisory Committee, Six Meter International Radio Klub (SMIRK), and other interested groups. This review with recommendations should be presented at the first Board Meeting in 1983.

Walter A. Linstruth, WA6JPR
2413 Burritt Avenue
Redondo Beach, CA 90278

22 August 1982

Mr. Paul Rinaldo, W4RI
1524 Springvale Avenue
McLean, VA 22101

Dear Paul,

I am writing to express my agreement with the basic tasks set forth for the Committee on Digital Communications (Minute 62), particulary with respect to the need for a strong emphasis on the development of communication channels for the experimenters who will be developing the protocols which we will ultimately standardize upon. With this in mind, I would like to discuss a couple of ideas I have regarding the nature of these communications channels.

Currently I subscribe to five periodicals which regularly cover the hobby digital communications scene. I feel that I am probably covering about 20 per cent of what I should in order to be well informed. I feel that the ARRL should promote the classification of the information contained in the literature and the publication of abstracts for dissemination to the known groups working in the field.

This could be accomplished through volunteers who would write up at least one abstract monthly, on a periodical that they happen to subscribe to, and foreward the manuscript to a central point for collection and distribution. I am unsure as to the best method for distribution of the collected abstracts. QEX is the first thought but the material may be a bit much for such a small publication.

This thought leads to the main point which I would like to make. That is that the field of digital communications (controlled by computers) is far too new to be concerned with specifying the "ultimate protocol" for use by all future generations. What we really need now is to promote the maximum amount of pure experimentation, covering as many network topologies as are possible while simultaneously developing as rapidly as possible the (several) means required to minimize duplication of effort, to speed the publication of experiment results (both good and bad)

and to feed this information to the regulatory agencies, protocol committees and other experimenters for their edification.

Obviously, the management of such a task is a large undertaking. I hope the national structure of the ARRL will serve to provide the framework for these tasks. We need a nation-wide communications network in order to develop our nation-wide communications network. Obviously the embrionic network will have to be somewhat "loosely coupled" and will probably not be entirely based upon the amateur radio bands.

With this in mind the South Bay Packet Radio group with which I am involved is currently working on a very simple version of the X.25 LAPB protocol. This protocol will make possible half duplex file transfers with full CRC checking either over the air or by telephone. The protocol is being developed using an ISO standard, public domain PASCAL and the intent of the group is to make it as universally applicable as possible. With this in mind we are developing the protocol using the character oriented portion of the LAPB procedures. This will allow the use of the protocol with standard async cards and 1200 baud Bell 202 compatible modems which are so popular today. In fact, the protocol is being developed by two local hams who have basically incompatible equipment. One has a Z-80 based CP/M system and the other is running a 6809 based system using a home brew PASCAL P-code run-time package.

We feel that the development of a simple, transportable protocol which will use commonly available equipment will help to provide the cost-effective record communications capability which will help us develop more sophisticated approaches.

Another resource which should be developed is the nation-wide network of remote CP/M systems, CBBS's and Conference Trees which are in place today. I am not sure of the statistics nation-wide but amateur radio operators own probably 10 per cent of the systems in operation in Southern California. If these system owners were to be fed the results of a coordinated information collection exercise, the latest information would be available at no cost to the public. Perhaps a version of the old calling tree would make the distribution of this information possible with minimal financial impact to the individual parties involved. This is the direction to which we are pointing with our "universal protocol" development exercise.

Your inclusion of the John Lindholm (W1XX) letter in a recent mailing points up another very valuable service which a central information agency could provide. So many amateur accomplishments end up being what I refer to as "monuments to themselves." This is how I describe any elaborate radio system

which is constructed primarily by technical types, for technical types, with solely technical ends in mind. The growth of digital communication has too many social implications to allow the tech types alone to control its form and content.

Obviously, the tech types must build and test the pieces of any system which we may ultimately end up with. What I am trying to say is that we must approach the development of these digital standards with a strong systems management approach which will solicit and incorporate feedback from ALL the amateur population.

The board's guidelines seem carefully worded with these concepts in mind. Just the same, I feel that it is important to pay immediate heed to the social tasks which lay before us as the tech folks are not going to be waiting around.

One final point which I would like to address is the fact that there is no mention of a specific task involving the direct application of digital communications techniques to the area of disaster communications. As a 20 year member of the Los Angeles County Disaster Communications Service (RACES), I am rather sensitive to the need for application of high reliability record communications techniques to this area.

I will keep you posted on developments here in the Southwest Los Angeles area. I hope this has not been too tedious for you to wade through.

73,

Wally

Walter A. Linstruth, WA6JPR

9-12-82

P.S. The LAPB protocol is essentially up. We are now overlaying VADCG type protocols on the existing S/W. I have conversed with HAROLD PRICE, NK6K using my VADCG Board and his Z-80 CP/M. SKIP HANSEN, WB6YMH now has a VADCG board and we have successfully held conversations with each other in paralled with Harold and DAVE HENDERSON. KD4NL — us on VADCG - them on LAPB. Skip has had me using his RCP/M VIA 2 mtrs with his VADCG operating in a SKIP-WRITTEN HOST MODE. 73 Wally

September 8, 1982

To: All amateur satellite publications.

From: Robert J. Diersing, N5AHD
4129 Montego
Corpus Christi, Texas 78411

Subject: Transmission and reception of digital packet data via Amsat-Oscar-8, amateur radio satellite.

In recent weeks, Dr. Tom Clark, W3IWI, of AMSAT and myself decided to begin testing the feasibility of transmitting and receiving packet radio data via satellite. We are both using the Terminal Node Controller (TNC) boards produced by the Vancouver Amateur Digital Communications Group (VADCG). Software was supplied by AMRAD, originally written by Doug Lockhart, VE7APU, and modified a great deal by AMRAD.

After several unsuccessful attempts to receive connect sequences from Tom via mode A we decided to abandon the two-way attempt and I would try to receive my own data. Since I already had three TNCs and two 1200 baud modems available, I would try sending QST packets and receiving them on another system. A small software modification had to be made such that the QST message and CW id were transmitted continuously rather than at 9 minute intervals as allowed by the original software. Better audio matching between modems and radios was also incorporated and testing resumed.

After several unsuccessful attempts, on September 1, 1982, 01:10 UTC, (an experimental day) orbit number 22887 mode J (or possibly AJ since I was not listening on mode A), digital packet data was transmitted and received at N5AHD. In some cases, the three line QST message was partially received and in others it was complete. The mode of transmission was NBFM in the middle of the satellite Mode J passband. At any time the signal was good quieting and the tuning for zero discriminator reading maintained, the copy was successful. No tests on SSB were made during the orbit.

Later, on September 6, 1982, 14:00 UTC, orbit number 22938, with satellite in mode J, several more successful receptions were made this time via SSB. The tuning in this mode was much more difficult which was expected. The number of complete packets received was much lower than when using NBFM probably due mainly to the better tuning indicator via the discriminator meter.

Needless to say, much more testing is planned and the results of those tests will be documented. This first iteration was simply to get HDLC packet data through an amateur satellite in low orbit successfully.

THE AMERICAN RADIO RELAY LEAGUE, INC.
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ADMINISTRATIVE HEADQUARTERS NEWINGTON, CONNECTICUT, U. S. A. 06111

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1524 Springvale Avenue
McLean, Virginia 22101
703-356-8918

September 24, 1982

To: Members of ARRL Committee on Amateur Radio
Digital Communications

Enclosed is a copy of the FCC's Report and Order on PR Docket No. 81-699, Use of Additional Digital Codes in the Amateur Radio Service. Note that there is probably a typo in para 97.69(b)(2) on page 2 of the Appendix, about 3.5 inches from the top. I think that it should have read "28" instead of "29" MHz. I have informed Chris Imlay who will bring it up with the FCC. I suggest that you look this over carefully and let me know what you think of the new rules above 50 MHz. Still pending is a rule change to permit AMTOR in the hf bands.

Also enclosed is a copy of a letter from Wally Linstruth, WA6JPR. I would appreciate your thoughts on these subjects and any others that you think should be considered by the committee.

Finally, there is a copy of a "News from Washington" column in a recent IEEE VTS peridical giving an executive summary of an FCC PRB document, "The Future of Digital Technology in the Private Radio Services," for your information.

73,

Paul L. Rinaldo, W4RI
Chairman

encl.

THE AMERICAN RADIO RELAY LEAGUE, INC.
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ARRL COMMITTEE ON AMATEUR RADIO DIGITAL COMMUNICATIONS

1524 Springvale Avenue
McLean, Virginia 22101
November 8, 1982

Dr. Henry S. Magnuski KA6M
311 Stanford Ave
Menlo Park CA 94025

Dear Hank,

Enclosed is a copy of QEX 10 which leads with two articles on the results of the meeting of most of the active U.S. amateur packet radio groups which took place in the Washington, DC area, October 8-10, 1982. Tom Clark, W3IWI called this meeting in the hopes that some agreement could be reached on AMICON (interim) standards. Standards of some sort are needed to enable ground stations to prepare for packet radio through the L1 packet Special Service Channel (SSC) when the AMSAT Phase III B satellite is launched (now scheduled for April 1983). Assuming that this launch date holds, packet stations would need to get ready by May/June 1983 when the satellite would become operational. That sounds like a long way off now, but there are numerous interlocking actions which need to occur in the meantime.

As you can see from the first article, agreement was reached on AMICON protocol levels 1 (Physical Layer) and 2 (Link Layer). Also, some agreement was reached on level 3 (Network Layer) at least to the extent of using a one-octet Protocol Identification (PID).

In discussing these protocols for AMICON applications, the participants were interested in adopting protocols which would also work on terrestrial packet networks, whether local-area networks (LANs) or for the intercity or backbone network. I believe that this was achieved. One particularly knotty problem which has caused many hours of discussion in the past has been how to handle packet radio repeaters (i.e., not full-fledged packet switches but repeaters which are just smart enough to recognize when a station wants it to repeat a packet and proceed to do so). Hank Magnuski's plan to include an optional third address (the repeater's call sign) in the link-level frame was accepted by the group. This optional repeater address is not for use on the satellite but for terrestrial use.

The above and the article are only broad-brush treatment of this subject. There is some follow-up work to be done:

Level 1 document: Paul Rinaldo is to draft a document on physical layer standards which will include modulation techniques and the contention scheme. Bob Carpenter, W3OTC is to contribute wording on the contention scheme. Jan King, W3GEY has already provided information on the 400-Bd DPSK modems already in use and will be asked to give an engineering description of the link (L1 SSC). Those in line to critique the draft will include: DJ4ZC, G8DQX, KA6M, SM0NBJ, SM5HEV, W3GEY, W3IWI and W3OTC.

Level 2 document: Terry Fox, WB4JFI is now putting the finishing touches on a the link-level document for AX.25 which will include all the changes agreed at the October 8-10 meeting.

(For those of you who haven't followed the development of AX.25, here's some background: Some of us in the Washington, DC area have been considering the use of the CCITT X.25 public packet switching network protocol for some time, but there were many problems and questions. The Washington, DC (AMRAD) and New Jersey (RATS) groups met on several occasions to develop a common protocol for the East Coast backbone network. X.25 was examined closely, but problems remained. We then met with Eric Scace, K3NA (member of this committee and, incidentally, one of the authors of X.25) and worked out an amateur implementation called AX.25. Eric was extemely helpful in clearing up some of the mysteries of X.25, working out the problems and devising an amateur implementation which would be legal and/or permissible in the context of X.25. Terry Fox was given the task of writing the link-level document and Gordon Beattie, N2DSY the job of writing the network-level specification for AX.25. Completion of these two documents is of high priority and is expected in a few weeks. After the documents are done, the work of writing code remains. As soon as it is received, the South Bay Packet Radio Group's X.25 LAPB protocol that Wally Linstruth, WA6JPR mentioned in his August 22, 1982 letter, will be closely examined.)

AMICON protocol document: Hank Magnuski will revise his AMICON document to incorporate the physical- and link-level documents mentioned above.

As you are aware, the October 8-10 meeting was held under the AMSAT/AMICON banner. The protocol agreements were endorsed by most of the active U.S. amateur packet radio groups which represents a quorum (if that is significant). Canadian and foreign packet groups were not represented except to the extent that Tom Clark relayed some views expressed to him by Europeans in Paris just a few days before. Care will be taken to coordinate these agreements with Canadian, German and Swedish groups.

Also, while this was not a meeting of the ARRL Committee on Amateur Radio Digital Communications, four of our members (KA6M, KD2S, K3NA and W4RI), were active participants. As for as committee action is concerned, I suggest that we let the after-meeting document drafting simmer for a few more weeks. As soon as I can get each document in more-or-less-presentable form, I'll send a copy to each committee member for review and comment. Ultimately, assuming that all goes well and after any disagreements are reconciled, I would like to see the committee endorse the protocols and send them to the ARRL Board of Directors for formal adoption. I believe that it is far too optimistic to accomplish this by the March 1982 Directors' meeting, but I would hope to be able to report substantial progress.

Your views on the above are invited, preferably in writing so I can reproduce them and share them with all committee members.

I also invite your attention to the second QEX 10 article on the low-orbit packet satellite. Because this is in a very formative state right now and because the time-fuse on system concept is fairly short, I suggest that you direct your comments and ideas to Den Connors who has been named U.S. coordinator for this project. Please send me a reproducible copy of correspondence, again, so I can share them with all committee members.

Incidentally, if you wish to telephone me, please use my work number 703-734-0878 which is good any time of day.

73,

Paul

Paul L. Rinaldo, W4RI
Chairman

cc: Vic Clark, W4KFC
David Sumner, K1ZZ
Tom Clark, W3IWI

THE AMERICAN RADIO RELAY LEAGUE, INC.

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ARRL COMMITTEE ON AMATEUR RADIO DIGITAL COMMUNICATIONS

1524 Springvale Avenue
McLean, Virginia 22101
December 26, 1982

Robert P. Haviland, W4MB
2100 S. Nova Rd, Box 45
Daytona Beach, FL 32019

Dear Bob,

George Woodward, W1RN, sent me your letter which you wrote to ARRL Hq. So, I'll try to answer it as best I can.

I think that George's reaction is probably the best quick answer -- that the idea originated as a stopgap measure before ASCII was legalized.

Circa 1975 and for about 5 years, a few hams were devising ways of sending computer programs via amateur (Baudot) RTTY and cw. Many were bothered by the lack of correspondence between ASCII, Baudot and Morse. The ASCII-Baudot conversion got complicated when people went to FIGS FIGS case just to fit most of the ASCII characters into the Baudot code. ASCII-Morse conversion was always flawed by the inability of most hams to learn all the legal Morse punctuation and other special characters, let alone a whole new set of contrived Morse characters equated to ASCII control functions. Of course, most people envisaged automatic reception of the special Morse characters by computer, solving the code-conversion problem but facing another -- that of marginal results copying on-off keying. So, toward the end of that period, I saw most people dropping such ideas and going simply to sending computer programs in hex. Zero thru 9 and A thru F are easy to handle in either Baudot or Morse. The burning need to send ASCII via Baudot or Morse disappeared as soon as the FCC legalized ASCII in March 1980.

There is another reason for having ASCII-Morse equivalents, however. That is, how to use a now-common ASCII keyboard to generate all Morse characters. For this reason, I think that it would be a good idea to have a conversion standard. I was forced to learn all the International Morse punctuation and something about foreign Morse code usage in one of my earlier incarnations, so I'm a little bothered when I see some of the conversions that people have devised. I guess that the people who have done the conversions don't know their Morse code very well and didn't do their homework thoroughly enough for it to gain any acceptance.

Here's an example from the Macrotronics card. International Morse uses "-.--.-" (or KK overscored) for both "(" and ")". The U.S. military/NATO usage is "-.--." (KN overscored) for "(" and "-.--.-" (KK overscored) for ")". If the author of the Macrotronics conversion scheme had known that, perhaps he/she would have avoided assigning "..-..." ("Hi in Japanese Morse) for "(". Another example might be why did the author use "--..-" for "+" when the "+" key top for Morse perforators produced ".-.-." or "AR overscored."

It is a little disturbing that Macrotronics didn't know why the author of the conversion did what he did. Also, they should have caught the misuse of the word "baud" under the explanation of spacing where "bit(s)" or "element(s)" would have been correct. So, all I can conclude from looking at the card is that the author knew something about the subject but didn't research the problem thoroughly and carry it to a useful conclusion.

I agree with your comment that the code assigned to the control characters is too long and should be more logical. Because there are quite a number of control characters, it might have been a lot easier to use a two-character sequence for control characters. That might take the form of a unique Morse code sequence (say "...---") to mean control character follows. So, "...--- ..." would mean Control-S or DC3. Oh well, I think the time for a full ASCII-Morse conversion, including control characters, is past.

However, it is probably a good idea to have a standard ASCII keyboard assignment for generating legitimate International Morse characters. I'll send copies of all of this to the members of the ARRL Digital Communications Committee so they can think about it. Don't expect much action for a while because the committee has a full platter well into 1983. Meanwhile, your further views are welcome.

73,

Paul

Paul L. Rinaldo, W4RI
Chairman

cc: George Woodward, W1RN
Members, Digital Communications Committee

ROBERT P. HAVILAND
2100 S. NOVA ROAD, BOX 45
DAYTONA BEACH, FLORIDA 32019

Dear OM's

Attached is a proposed computer morse code standard.

A direct inquiry to Macrotronico gave the response that the drafter of the proposal was no longer with them, and that they didn't know where he had gotten his ideas.

It seem that this is basically a good idea, But that it needs more thought and discussion. How about assigning it to a committee to develop a ARRL proposal, to be ready in six months or so.

Personally, I dont much like 7 character code: six should do. Also DC1- DCC shoved be more logical.

Let me know if I can do any thing.

73

Bob

W4MB/KK2XJM
R. P. HAVILAND
2100 S. Nova Rd. Box 45
Daytona Beach, FL 32019

Proposed Computer MORSE Code Standards

# Pound	
$ Dollar	
& Ampersand	
) Right Parenthesis	
(Left Parenthesis	
* Asterisk	
+ Plus	
! Exclamation (Attention)	
< Less Than (KN)	
> Greater Than (SK)	
= Equal To (Break)	
@ At Symbol (AR)	
^ Caret (AS)	

CONTROL FUNCTIONS

CR Carriage Return	
LF Line Feed	
DC1 Device Control 1	
DC2 Device Control 2	
DC3 Device Control 3	
DC4 Device Control 4	
DC5 Device Control 5	
DC6 Device Control 6	

MACROTRONICS, inc.®
1125 N. Golden State Blvd. / Suite G
Turlock, California 95380
(209) 667-2888 / 634-8888

The International MORSE Code for radio communication

A		Ä	
B		Å	
C		CH	
D		É	
E		Ñ	
F		Ö	
G		Ü	
H		Period	
I		Semicolon	
J		Colon	
K		Comma	
L		Quotes	
M		Question Mark	
N		Apostrophe	
O		Hyphen	
P		Fraction Bar	
Q		Parenthesis	
R		Underscore	
S		Break	
T		Percent	
U		Separation	
V		Attention	
W			
X			
Y			
Z			
1			
2			
3			
4			
5			
6			
7			
8			
9			
0			

SPACING
● DIT = 1 BAUD
▬ DAH = 3 BAUD
Interelement space = 1 BAUD
Intercharacter space = 3 BAUD
Interword space = 7 BAUD

TIMING
Words per minute = number of times the word "PARIS" is sent in one minute.

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OFFICIAL JOURNAL

December 21, 1982

Mr. Robert P. Haviland, W4MB
2100 South Nova Road, Box 45
Daytona Beach, FL 32019

Dear Bob:

Thanks for sending us the card containing the Macrotronics proposed computer Morse code standard. I suspect that idea originated as a stopgap measure before ASCII was legalized in the Amateur Radio Service. I'm forwarding your note to Paul Rinaldo, W4RI, who is the chairman of the ARRL Digital Communications Committee. I serve as headquarters liaison for the group.

Best holiday wishes,

George H. Woodward, W1RN
Assistant Technical Editor

THE AMERICAN RADIO RELAY LEAGUE, INC.
HEADQUARTERS SOCIETY OF THE INTERNATIONAL AMATEUR RADIO UNION
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ARRL COMMITTEE ON AMATEUR RADIO DIGITAL COMMUNICATIONS

1524 Springvale Avenue
McLean, Virginia 22101
December 1, 1982

Dr. Henry S. Magnuski KA6M
311 Stanford Ave
Menlo Park CA 94025

TO : Members, ARRL Committee on
Amateur Radio Digital Communications

SUBJECT: Digital Directory

You will recall that one of the committee tasks approved by the ARRL Board of Directors was to develop an ARRL data communications directory, to serve a function similar to the "Repeater Directory."

The purpose of this letter is to solicit your inputs on this project so that work can start.

It is somewhat difficult handling this type of problem via correspondence, but please bear with me. Because everyone is busy, I think that the least burdensome way to get your inputs is to send you a questionnaire which covers the important points. I would appreciate each member filling in the enclosure and returning it to me by January 1, 1983, using the enclosed s.a.s.e. If you can't supply complete answers to all questions, please fill in what you can.

73,

Paul L. Rinaldo, W4RI
Chairman

Distribution:

Orig: Members w/questionnaire & s.a.s.e.

cc : Vic Clark, W4KFC w/questionnaire for info only
David Sumner, K1ZZ w/questionnaire for info only

DIGITAL DIRECTORY QUESTIONNAIRE

Completed by:_____

1. Title: Do you think that (a) "ARRL Data Communications Directory," (b) "ARRL Digital Directory" or (c) some other title best fits? ("Data communications" would encompass RTTY and computer communications.) ("Digital" is broader and would include digital voice, image and other modes.)

2. RTTY Repeaters: Should the directory include Baudot (and async ASCII, that is not packet) repeaters? (I have in mind the type of RTTY repeater that is found in some areas on 146.10/.70 MHz, designed to pass or regenerate RTTY with an option of trapping out speech.) If so, what essential elements of information (EEI) should be included on each repeater?

3. HF RTTY MSOs: Should we include so-called "message storage" or "mailbox" operations that appear on the hf bands? All or just the "legal" ones, i.e., those run only when attended or under a Special Temporary Authority (STA)? What EEI? Do you know of specific ones and how to obtain EEI?

4. Packet Facilities: This category would include all packet repeaters (sometimes called "digipeaters"), packet-switching nodes, host computers providing service to packet radio users, and any other packet facility that you can think of. What are the types that you'd like to see; what EEIs for each type.

5. Computer-Based Message Systems: This term, abbreviated "CBMS" seems to be the one that the industry is settling on to describe things like the Computerized Bulletin Board System (CBBS). Do you think that we should include a listing of CBMSs accessible via landline? If we should include them, should we list as many as possible so that interested hams can have the info? Or should we be somewhat selective (all the respectable ones; or, just those run by hams or those for which we can find a ham who will service it for refiling of messages)? What EEIs? (Please refer to the photocopy of one page of the February 1981 "AMRAD CBBS Directory," enclosed. I have this data on 8-inch CP/M disk and have some update info which has not yet been keyboarded. AMRAD has no plans to republish such a directory and will contribute it to this effort.)

6. Other Digital Facilities: What might they be (now or in the near term)? What EEIs?

7. Organizations: Should we include a list of amateur radio organizations that are involved in digital communications operations, experimenting, etc.? (E.g., organization name, contact person, address, phone, what they do or offer, membership, newsletter.)

8. Individuals: Should we list individual radio amateurs involved in digital communications? If so, what EEIs? (I see a need coming for this type of information particularly in packet radio to look up what node/net someone normally logs in on and any other networking addressing information.)

9. Gathering Information: I have in mind preparing a written call for information, with forms similar to those used to obtain data for the repeater directory, and asking Hq to send it to all clubs in a next mailing. We could also solicit this information directly from anyone we know is sponsoring a digital facility. Ideas?

1Ø. Committee Member Tasks: What can you (or your club) do to gather any part ofthe necessary information, compile it, and print it in camera-ready form? (I can accept inputs on 8-in. CP/M disks, handle editing and camera-ready printing.)

11. Comments: What's been forgotten?

Alabama

City	Phone No.	St.	Type	Sponsor, or Name of Sysop	Address and	Zip	Hours	Baud Rates	Notes
Birmingham	205-945-1489	U	ABBS	The Computer Center	433 Valley Ave	35209	E&W		(V)205-942-8567
Birmingham	205-942-6621			Birmingham Micro.Comp.Grp			E&W	300	

Alaska

City	Phone No.	St.	Type	Sponsor, or Name of Sysop	Address and	Zip	Hours	Baud Rates	Notes
Ketchikan	907-225-6739		ABBS						

Arizona

City	Phone No.	St.	Type	Sponsor, or Name of Sysop	Address and	Zip	Hours	Baud Rates	Notes
Phoenix	602-957-4428	U	EBBS	Desert Technology	Po Box 15113	85060	*24		
Phoenix	602-866-0258	U	ABBS	The Computer Store	14216 N.28th Dr.	85029	E&W		
Phoenix	602-956-5612	U	CBBS	Chris			*24		(V) 602-957-4471
Phoenix	602-957-9282	U	ABBS	Computerland of Phoenix	3152 E.Camelback	85106	E&W		Store 955-1486

Southern California

City	Phone No.	St.	Type	Sponsor, or Name of Sysop	Address and	Zip	Hours	Baud Rates	Notes
Los Angeles	213-276-4276	N	ABBS	27-Micro					
Los Angeles	213-291-9314		PMS						
Torrance	213-316-5706	N	ABBS						
Woodland Hill	213-346-1849		ABBS						
Canoga Park	213-340-0135		ABBS	Original AppleCorps			*24		
Torrance	213-349-3715	U	APPLE	Teleph. S'ware Conn.					
Granada Hills	213-349-5728		ABBS	Rainbow Computing	10723 White Oak Av.	91344			(V) 213-360-2171
Los Angeles	213-360-6332	B	ABBS	System pulled					
Los Angeles	213-367-0013		CBBS	Valley Comp.Club ?	PO Box 6545	91510			may be old/bad No.
Lawndale	213-370-3160		ABBS				E&W		
Van Nuys	213-371-1660		ABBS	Computer Components	5848 Sepulveda Bl.	91411			(V) 213-768-7411
Tarzana	213-383-9666		Novation	Modem Test Center	18664 Oxnard St.	91356			(V) 213-996-5060
Santa Monica	213-394-1505		ABBS	Computer Store			E&W		
Brentwood	213-395-1592		ABBS	Programma Int'l			*24		
Santa Monica	213-396-3905		ABBS						
Signal Hill	213-424-3506	B	ABBS	Peripherals Unltd	Moved to Vienna Va.				
Long Beach	213-428-4718		ABBS						
Pacific Pal.	213-459-3177	B	ABBS	system pulled					
Long Beach	213-459-6400	U	ABBS	Pacific Palisades					
Los Angeles	213-566-8035		Forum 80						
Los Angeles	213-631-3186		Forum 80						
Los Angeles	213-654-0759		ABBS						
Inglewood	213-673-2206	U	ABBS	Morris Micro Prod.			*24		
Hawthorne	213-675-8803		ABBS				*24		
El Segundo	213-679-0591		ABBS	Hughes Apple Users					
Burbank	213-709-5423	U	RCPM	Valley Computer Club	PO Box 6545	91510	E&W	110,300	Mike Karas
Van Nuys	213-787-4004	B		Not in Service					
Pasadena	213-795-3788		CBBS	Aardvark Comp.					
Pasadena	213-799-1632	U	CBBS	Dick Mead			*24	110-600+	
Pasadena	213-799-6514		ABBS						
Marina Del Ray	213-821-7369		ABBS				*24		
Los Angeles	213-826-0325		ABBS	Deltrex			*24		
Santa Monica	213-828-3400		ABBS	MC Computer Store			E&W		Rich Conners
San Fernando	213-843-5390		CBBS						
Woodland Hills	213-887-6521		CBBS	Litton Comp.Club	550 Canogo Ave.	91365			(V) 213-887-2321
Los Angeles	213-921-2111		ABBS	Computer Forum					